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The PALIMPSEST

THE UNIVERSITY MUSEUM OF NATURAL HISTORY

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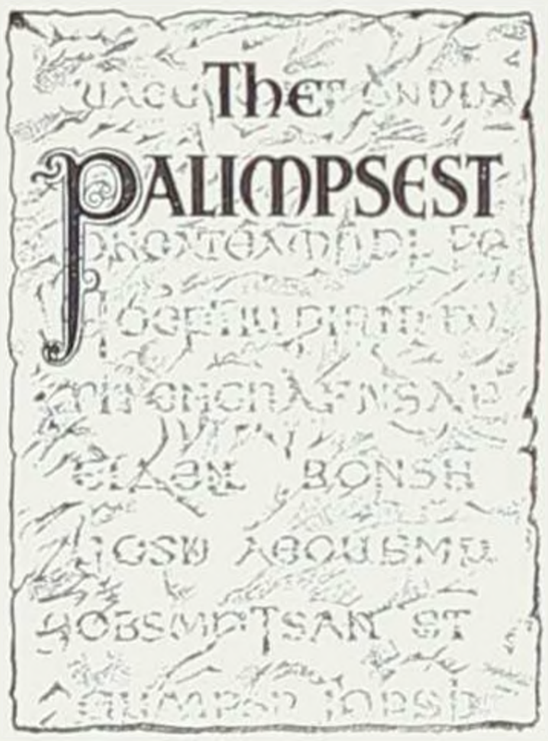

The Meaning of Palimpsest

In early times a palimpsest was a parchment or other material from which one or more writings had been erased to give room for later records. But the erasures were not always complete; and so it became the fascinating task of scholars not only to translate the later records but also to reconstruct the original writings by deciphering the dim fragments of letters partly erased and partly covered by subsequent texts.

The history of Iowa may be likened to a palimpsest which holds the records of successive generations. To decipher these records of the past, reconstruct them, and tell the stories which they contain is the task of those who write history.

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Author

Professor Homer R. Dill has been associated with the University Museum since 1907 and was Director from 1926 until his retirement in 1949.

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THE PALIMPSEST

EDITED BY WILLIAM J. PETERSEN

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The University Museum

To the thoughtful person, scientist or layman, the Museum of Natural History at the State University of Iowa is an important institution. It is not only a place where natural objects are assembled to show the relation of man to the lower forms of life, but it is also a dynamic expression of the marvelous and manifold works of Nature. Children love animals and other natural objects, and unless their interests are turned aside and crowded out by other things, they will have their lives broadened and enriched by visits to the Museum.

The Iowa Museum of Natural History was established by an act of the state legislature in the year 1858. It was housed in the Old Capitol building for the first 28 years of its life. It seems very fitting that a department which has contributed so much to the development of the University had its start in Old Capitol. The Museum was first called a "Cabinet of Natural History," a term that was applied to collections of that day, although they were actually museums in our modern sense.

The Museum differs from most of the departments in the University in that its collections were obtained through expeditions which were financed by friends of the University rather than by state appropriations. It has also benefited by many invaluable gifts.

Theodore S. Parvin, professor of natural history, had charge of the Museum from its beginning until 1870. He was succeeded by Dr. Charles A. White, who resigned in 1873. Professor Samuel Calvin came to the University in 1873 as acting professor of natural science and curator of the Cabinet of Natural History. In 1886 Charles C. Nutting was appointed curator of the Cabinet and instructor of natural history. Three years later the Cabinet (now called Museum) and systematic zoology were made into a new department under Nutting, and in 1891 Henry F. Wickham was appointed assistant curator. In 1906 Homer R. Dill came to the University as taxidermist and assistant professor of zoology. In 1908 he became director of the vertebrate section of the Museum, still under Nutting as curator. In 1926, when Nutting resigned on account of failing health, Dill became director of the Museum.

At this time the Museum was separated from the department of zoology. From 1926 until 1949 the Museum was a separate Division of the University. At the time of Dill's retirement, the Museum was made a department in the School of Fine

Arts under Dr. Earl Harper. Professor Walter C. Thietje, who had been Dill's assistant for over twenty years, was appointed curator of the department. Thietje's fine taxidermic work has done much to put the Museum in the high standing it has today.

During the early years the Museum was used only by scientists who were classifying and naming different natural objects pertaining to the field of work in which they were employed. There was no attempt to exhibit this material other than to make it available for their use. Although people could see the collections on request, the Museum was not open to the public.

In 1886 the Museum was moved from Old Capitol to the old Science Building, now known as the Geology Building. Here the collections were housed, and much valuable material was assembled through expeditions and gifts. By 1905 the department had grown to the point where it needed more space. Plans were made for a fine stone building for the Museum, which would also house laboratories for the departments of zoology, botany, and geology. A committee was sent East to visit a number of the larger museums to get plans for the museum rooms and cases.

Just as this beautiful dream was about to come true, two very unfortunate things happened. A fire burned old North Hall, leaving what was not burned of the library without a suitable home. A

part of the Museum building had to be used to house the library. And that was not all. The President wanted an assembly; so another slice was taken out of the middle of the building to make what is now known as Macbride Auditorium. Making the best of what was left, the zoology department and the Museum used the two ends of the building, while the other science departments had to remain in their old quarters. In the north end on the top floor was Bird Hall, while Mammal Hall was in the south end on the same floor. Directly under Mammal Hall was Invertebrate Hall, which contained all of Professor Nutting's collections of sea life, beautifully displayed in alcove cases.

By the time that Professor Nutting resigned in 1926, the study of systematic zoology was being replaced by morphological and experimental studies, and the man who was to take his place as head of zoology had no use for the Museum. The cases in Invertebrate Hall were moved into the corridors in order that this space could be cut up into small rooms for the new work in zoology. Many boxes of fine specimens were also packed away in the attic. At this time it was definitely understood that the Museum would have space for this material when the library moved out. A year later zoology moved into the building vacated by the Medical College. To see his lifetime work torn apart and wrenched away was heart-breaking indeed for

Professor Nutting. He died a very unhappy man less than a year later.

At the time the new science building was completed, Professor Nutting had realized that he must have a trained museum man to take charge of the modern exhibits such as he wanted in the building. With the appointment of Homer R. Dill, Nutting turned over to him virtually all of the responsibility of collecting the material and making the habitat groups in the new building. During the forty-three years of active work that Dill put in with the Museum, he raised money for many expeditions to various parts of the world, collected thousands of specimens, and executed a large number of habitat groups, including the unique and famous Laysan Island Cyclorama.

First organized by Professor Dill in 1910, courses in museum training have been one of the features which have made this Musuem unique, as the University of Iowa is the only institution offering such work as regular college training. The courses are designed to take care of a number of different groups of students: first, to train students as expert museum workers; second, to teach them how to prepare scientific skins in the field; third, to give science teachers a knowledge of preparing natural objects to be used in teaching. The core courses in science, recently introduced into the University curriculum, have found the collections in the Museum of incalculable value for their work.

Museum Expeditions and Gifts

Expeditions

The expeditions sent out by the Museum may be divided into two classes. The first were almost entirely for the collecting of material for the use of the systematic zoologists; in the second class, a broader view was taken, and material collected was for exhibition purposes as well as for study.

In 1890 Professor Nutting and Professor Calvin made one of the earliest Museum expeditions — to the Bay of Fundy. There they collected sea birds, seals, and marine invertebrates.

Early in 1891 Professor A. G. Smith and Frank Russell, a graduate student, planned a trip to the northern shores of Lake Winnipeg, Manitoba, to collect birds. After the trip was arranged, Professor Nutting decided to go along and take charge. While on this trip, Frank Russell met an ornithologist who had lived in the north country for years, and from this man's description of the field as a collecting ground, Russell became very enthusiastic about making a trip to the Far North. Professor Nutting placed the plans before the Board of Regents of the University. The Board approved sending Russell on the expedition, but no money was appropriated. President Charles A.

Schaeffer kindly advanced the money from his own pocket. In all, Frank Russell spent three years (1892–1894) on this trip. He brought back specimens of musk-ox, caribou, moose, a grizzly bear new to science, and many birds and small mammals. In addition, he collected a number of ethnological specimens including some fine carved ivory.

Other expeditions attracted much attention. In 1893 Professors Nutting, Houser, and Wickham organized a party of twenty-one members, including many senior students of zoology, for a trip to the Bahama and Dry Tortugas islands. A carload of material was collected, consisting almost entirely of marine invertebrates. Some 1,300 marine hydroids, Professor Nutting's specialty, were also brought back. The Barbados-Antigua Expedition, sent out under Nutting's direction in 1918, found more material to fill out the marine group; while another very large collection was obtained in 1922, when Professors Nutting, Stoner, Wylie, and Thomas visited New Zealand and the Fiji Islands.

Through the financial help of Mr. E. M. Brown of Des Moines, three successful expeditions were sent out in 1920 and 1924 under the direction of the author. The first expedition, in June and July of 1920, visited the Hawaiian Islands for the express purpose of collecting fishes for the University Museum and for Mr. Brown's private museum at Des Moines. Over two hundred specimens of highly colored fishes were collected and preserved

in a new preserving fluid invented by the author. The results of this trip may be seen in the fish exhibit at the Museum. In September of that same year Mr. Brown financed an expedition to the Cascade Mountains in Washington for the purpose of collecting mountain goats. With the assistance of Robert Brown, Russell Hendee, C. J. Albrecht, and B. E. Manville, a fine series of goats was collected. Birds and small mammals were also brought back. In the spring of 1924 Mr. Brown sponsored a third expedition, this time to Mazatlan and Guaymas, Mexico, to collect the fish which come up from the south as far as the Gulf of California. Hundreds of fine specimens were taken, also some sea birds.

In 1926 Mr. T. A. Wanerus suggested to the author that he come out to his Wyoming ranch and collect some antelope for the Musuem. Mr. C. H. Fishburn financed this trip. The fine animals which adorn the antelope group in the Museum were secured on this expedition.

Gifts

Over the years the Museum has received so many gifts that no attempt will be made to describe them all, since they have all been recorded in the Museum catalog. There are some, however, that have played an important part in building up the collections, and also are especially interesting to Iowans.

Without doubt one of the finest gifts ever received by the Museum is the wonderful collection of mounted birds and mammals from all over the world, collected and presented by the late Dr. Wm. T. Hornaday in 1886. Outstanding in this collection are the marsupial mammals from Australia, including a number of kangaroos, phalangers, echidna, platipus, and even a number of koala bears, which are almost extinct. One of the conditions under which this collection was presented was that it should be kept in a separate room known as the Hornaday Room. When the Museum was moved to the new building in 1908, Dr. Hornaday gave his permission to have the material put into the general collection. During the early days these specimens formed the backbone of the Museum.

Among some of the larger gifts presented in 1887 was the D. H. Talbot collection of bird skins, numbering several thousand specimens. Perhaps the most valuable in this lot was a series of Carolina parakeets and a number of whooping cranes. In 1931 T. W. Dewing of New York City gave the writer his collection of North American birds' eggs, numbering over one thousand sets. This collection was presented to the Museum. In 1925 a set of Alaskan sea birds was given to the Museum by two former students, Alfred M. Bailey and Russell W. Hendee. This material was used in making the Bering Sea exhibit.

Through the efforts of the late President George T. Baker of the Board of Education, the bird collection of the Rev. C. M. Jones of Boston, Massachusetts, was presented to the Museum in 1928. President Jessup sent the author to Boston to interview the members of the Jones family, and after some months of delay, the collection was finally sent to the Museum. In it was a very extensive and complete series of New England birds, also a set of field notes which were printed and placed in the Museum library.

One of the unique and interesting gifts to the Museum was a set of clothing and hunting and fishing equipment of the Blond Eskimos. This material was collected and presented by Vilhjalmur Stefansson, the Arctic explorer, an alumnus of the University.

In the lower corridor of the Museum there is one case filled with Javanese Batik, carvings, beadwork, and silver from Java. This beautiful collection was presented by Mrs. Sarah Huftalen.

In 1904, at the time of the World's Fair at St. Louis, a commission was sent to the Philippines to get material for an exhibit at the Fair. After the Fair was over, this material, consisting of native clothing, baskets, beadwork, carvings, and models of huts, boats, fish-traps, as well as native spears, bows, and arrows, was given to the Museum.

While the Museum is rich in its collections of bird skins, numbering many thousands, it also has

quite a number of extinct and nearly extinct birds, a series of which makes a special exhibit in one of the corridor cases. In this case there is a replica of a dodo, made by the author from bones, data, casts, and drawings obtained from the American Museum in New York, the Chicago Museum, and even from Aberdeen, Scotland, where the only outer parts of the dodo were ever saved. There is also a replica of the Labrador duck, the Great Auk, and mounted specimens of the heath-hen, whooping crane, Eskimo curlew, ivory-billed woodpecker, Laysan teal, honey-eater, miller bird, and Carolina parakeet.

The great naturalist, Dr. Wm. T. Hornaday, was so much impressed that he wrote the following legend especially for this exhibit:

> During the past 100 years, many valuable species of birds and mammals have been exterminated, and many more have been nearly extinguished. . . . The most important North American birds that have been exterminated either wholly or nearly so, are represented in this collection. . . . It is high time that all lovers of wild life should seriously consider the progressive extinction of valuable species, and the good citizen's duty to help preserve them.

Expedition to Laysan Island

On February 3, 1909, President Theodore Roosevelt issued an Executive order: "Cure Island, Pearl and Hermes Reef, Lysianski or Pell Island, Laysan Island, Mary Reef, Dowsetts Reef, Gardiner Island, Frost Shoal, and Bird Island, situated in the Pacific Ocean at and near the extreme western extension of the Hawaiian Archipelago, are hereby reserved and set apart — as a preserve and breeding ground for native birds — . . . to be known as the Hawaiian Reservation."

The Hawaiian Island Reservation is composed of the islands and reefs included in the leeward chain extending in a northwesterly direction from the main Hawaiian Group. These islands are situated from 100 to 300 miles apart and are composed principally of lava. Laysan, the largest island in the reservation, is low and flat, the highest point being only 50 feet above sea level. On the surface of this island is a layer of coral sand and phosphate rock. Laysan has an area of about two square miles; the others vary in size from one square mile to small rocky reefs.

The purpose of the reservation was to insure for all time a refuge and breeding place for the numerous species of birds, chiefly sea fowl, that for

ages past had made the islands their home during the whole or a part of each year. In the spring of 1909, however, a party of Japanese plumage hunters landed on Laysan, the principal rookery of the reservation, and for several months made the slaughter of birds a business. Had they not been interrupted by a United States revenue cutter they would probably have exterminated the entire colony of birds on the island and perhaps on others of the group. As it was, many thousands of sea birds were destroyed, especially albatrosses. There was, however, no reason to doubt that, if left to themselves as much as possible and if further depredations could be prevented, the birds would in time repair this loss and continue to live as they had for thousands of years before civilized man intruded on their beautiful avian world.

The islands are entirely uninhabited by man, but Mr. Max Schlemmer, former owner of the guano company on Laysan, lived on Laysan Island for fifteen years. In 1903 he introduced domestic rabbits and Belgian and English hares into the island, intending to start a rabbit canning business.

Professor C. C. Nutting, who had visited Laysan in 1902, made arrangements in 1911 with the Department of Agriculture to send a co-operative expedition to the island for the Bureau of Biological Survey. Data were to be gathered for a comprehensive report as to the conditions of the rookeries, and as to the effects of the work of the

poachers on the avifauna; and a collection made of birds, their nests, eggs, and the necessary accessories for making a large panoramic group for the Museum of the State University of Iowa. The party was in charge of Professor Homer R. Dill, with Charles A. Corwin as artist, and H. C. Young and C. J. Albrecht as assistants.

As a landing could be effected on the island only in favorable weather, our party set sail on April 17, 1911, from Honolulu on the revenue cutter *Thetis*. During the first five days of our trip few birds were seen except for a number of black-footed albatrosses that followed the ship nearly all the way. When within about fifty miles of Laysan, their numbers increased, and were joined by a few of the white species, some sooty terns, and wedge-tailed shearwaters.

About 11 o'clock of the seventh day, the island was sighted. We expected to see clouds of birds about it, but in this we were disappointed. It was too early for terns to arrive in large numbers. We reached the shore about 3 o'clock and spent the remainder of the day in landing our outfit and repairing the old buildings for our use.

Our first impression of Laysan was that the poachers had stripped the place of bird life. An area of over 300 acres on each side of the buildings was apparently abandoned. Only the shearwaters moaning in their burrows, the little wingless rail skulking from one grass tussock to an-

other, and the saucy finch remained. It was an excellent example of what Professor Nutting called the survival of the inconspicuous.

Here on every side were bones bleaching in the sun, where the poachers had piled the bodies of the birds as they stripped them of wings and feathers. In the old open guano shed were the remains of hundreds and possibly thousands of wings which were placed there but never cured for shipping, as the marauders were interrupted in their work.

An old cistern back of one of the buildings tells a story of cruelty that surpasses anything else done by these heartless, sanguinary pirates, not excepting the practice of cutting the wings from living birds and leaving them to die of hemorrhage. In this dry cistern the living birds were kept by hundreds, and allowed slowly to starve to death. In this way the fatty tissue lying next to the skin was used up, and the skin was left quite free from grease, so that it required little or no cleaning.

Many other revolting sights, such as the remains of young birds that had been left to starve, and birds with broken legs and deformed beaks, were to be seen. Killing clubs, nets, and other implements were lying all about. Hundreds of boxes to be used in shipping the birds' skins were packed in an old building.

Half an hour's walk, however, led to an entirely different scene. The north, east, and south parts of the island had not been disturbed to any extent

by the poachers, who had confined their work largely to the area nearer the buildings and along the car track formerly used by the guano company.

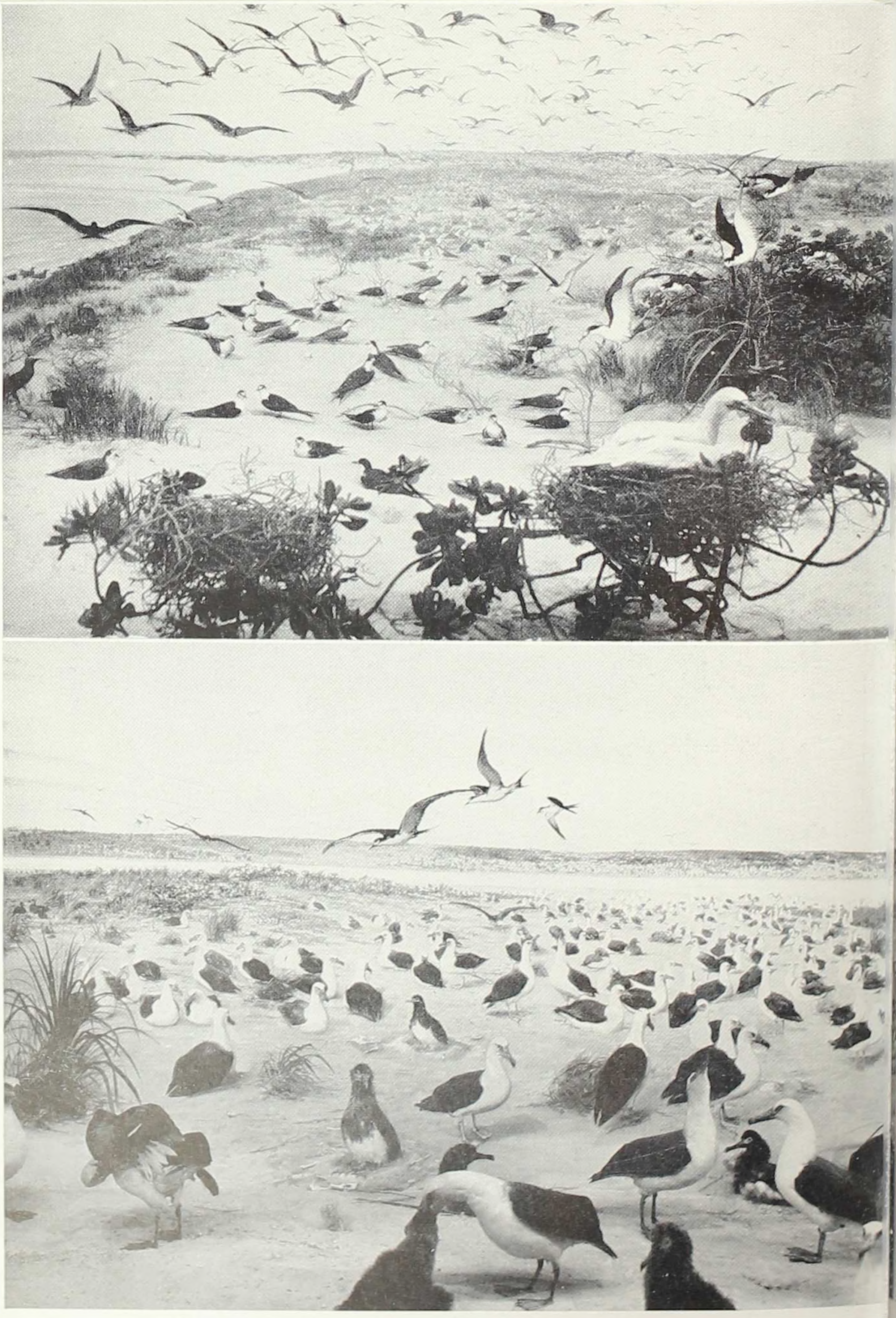
Some species were found on the east side even more abundant than reported by Professor Nutting in 1902. We were much impressed with the surprising tameness of the birds. With a few exceptions most species could be caught in the hand. It was interesting to note the habits of the gregarious little creatures. For countless generations they had lived in a crowded community, like the inhabitants of our larger cities. Now, although the killing of thousands of birds on the west side of the island had made nesting places available elsewhere, they still lived as did their predecessors, nesting as closely as possible.

All the islands in this group had a vegetation of low bushes and sand grasses. The climate was warm but not enervating, tempered as it was by the northeast trade winds. Severe thunder storms were almost unknown. Frequent but short showers supplied us with plenty of drinking water. We carried a small still for use in case our water supply failed us, but did not have occasion to use it, although our supply was reduced at times.

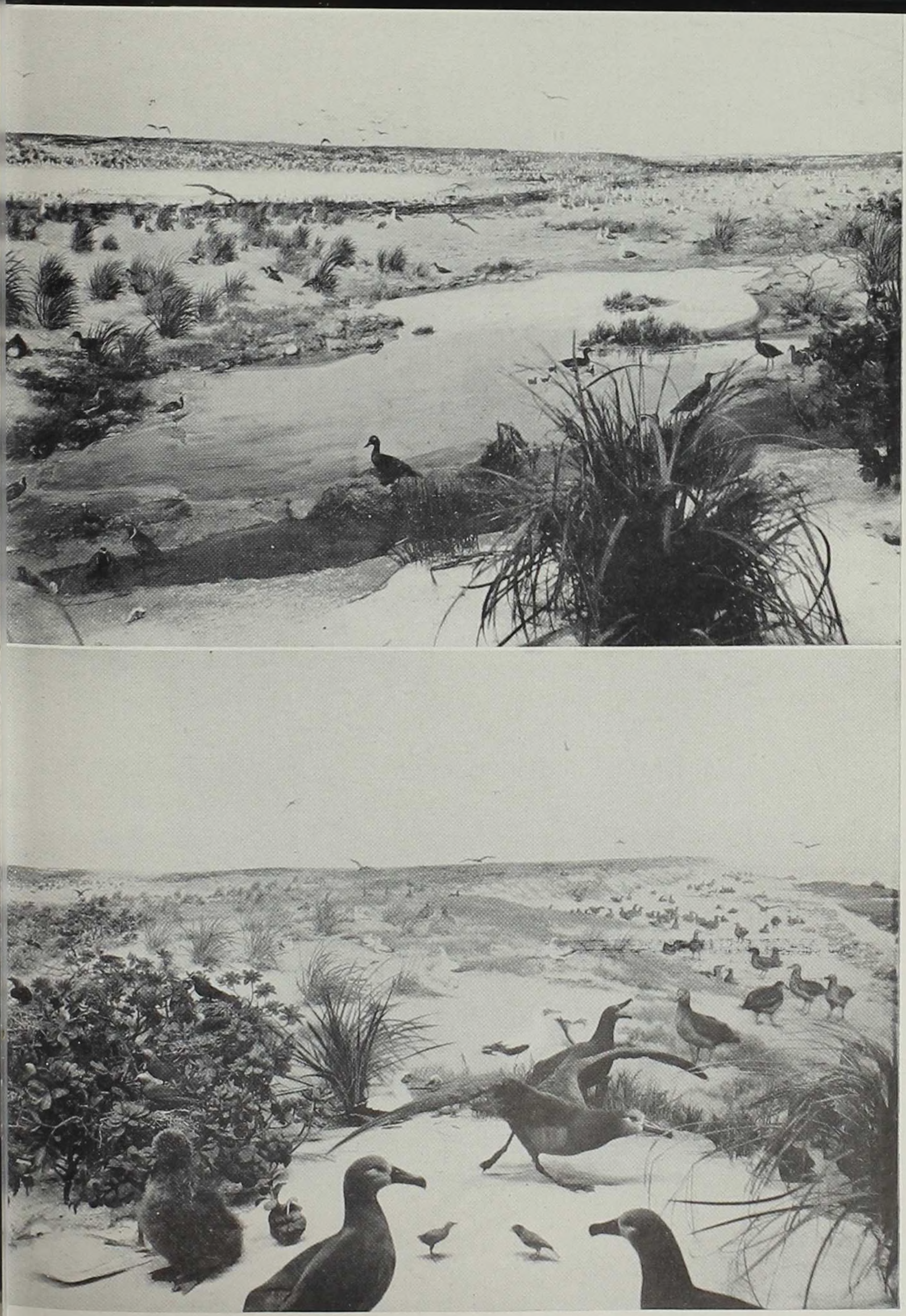
Plenty of good fish could be found in the still water between the surrounding barrier reef and the shore, and they could easily be shot with a good rifle. Large crawfish were also obtainable and were easily caught in the evening by using a

Display by Walter C. Thietje — Background painted by F. L. Jacques

LESSER SANDHILL GROUP — Two whooping cranes at left



Top: Rookery and swarm of Sooty-backed Terns.
Bottom: Main rookery, Laysan Albatross.



Top: Laysan Teal, Bristle-thighed Curlew, Miller Bird, Golden Plover, and Turnstone.
Bottom: Rookery of Black-footed Albatross; Laysan Finch and Rail, center foreground.

Antelope Group From Wyoming

flashlight and a spear. Large turtles were found along the beaches, where they crawled out to sun themselves. When turned on their backs they were helpless. We killed one of these turtles, and found the meat very good, but the eggs were unpalatable. This turtle was four feet long, three feet wide, and one foot, five inches from carapace to plastron. We estimated her weight to be 300 pounds. Although there were many edible shore birds on the island, our party did not kill any of them for food.

The rabbits were good food and their flesh seemed to be free from parasites. When not frightened they could easily be caught in the hands. They had killed many of the bushes, but had not caused so great a devastation as one would expect from their numbers. In the latter part of the afternoon, they could be seen feeding. They were very fond of the green juncus that grew near the lagoon, and while they were eating, their bodies were concealed among the thick growth, and only their ears showed.

It would have been very difficult to exterminate the rabbits without harming the birds. They lived everywhere; we saw many of them in the large tern rookeries. They had made burrows of their own, but when pursued they took refuge in the numerous petrel burrows. It was impossible to drive or snare them, as there were plenty of holes in which they could find shelter. Poisoning the rabbits would be disastrous to certain species of

birds, and indiscriminate shooting would have been harmful.

The year following our expedition, the Biological Survey sent some men to Laysan to kill off the rabbits. The party consisted of Commodore Salisbury, United States Navy, George Willett of the Department of Agriculture, and Mr. Wallace of Stanford University. After the party was made up, Chief H. W. Henshaw wrote to our Museum asking if it would be possible for them to get the cook that went on the Laysan expedition with us to go with their party. The cook did not care to make another trip to Laysan; so we sent Alfred M. Bailey, one of our students, along as cook. If the party had been properly supplied with ammunition and other equipment, and could have killed all of the rabbits, the land birds might have been saved. As it was they spent three months on the island and ran out of ammunition long before all the rabbits had been killed. As more space was made available, as well as more food, by the killing of many rabbits, the birth rate increased, so that by the time the party left the island there were more rabbits than when they landed.

Guinea pigs were found on the south end of the island in the thick juncus. They were rather abundant in this one place, seven being seen at one time, but they had done no harm. Mr. Schlemmer also introduced these animals.

A little-known species of seal (Monacsus

schuinslandi-Matschie) was reported to live in the region of Laysan Island. Max Schlemmer said that during his stay on the island seven of these animals were killed. No signs of seals were noted while we were there.

The collector is not without his troubles on Laysan. Never have I seen so many flies in one small area. Our laboratory was so full of them that we were obliged to suspend work to reduce their numbers. Shallow pans of formalin, about 2 per cent, did wonders in this direction. Not only did the flies annoy us as we worked, but they would blow our bird skins. Even after the skins were thoroughly dry and cured, we often found masses of eggs deposited on the feathers. The feet of the larger birds would be eaten by larvae if they were not thoroughly poisoned. In addition to the flies, there were small ants which ate the feathers of the smaller specimens. There were also several species of beetles, the larvae of which devoured everything that was not well poisoned. The acres of carcasses left by the poachers had furnished breeding places for flies and beetles; hence the great numbers.

Mr. W. H. Henshaw, Chief of the Biological Survey, had requested that our party make careful observation as to the presence of seeds or balls of earth attached to any portion of the bills, feet, or plumage of the island birds, since there was reason to believe that birds play an important part in the

transportation of seeds from shore to shore. In handling and preparing 400 specimens we found but one that was of interest in this connection. On the foot of a Laysan albatross, between the second and third toes, was a spinate seed about the size of a flattened buckshot, and the spines of which were firmly embedded in the sides of the toes. The seed was sent to Washington, where it was identified as the seed of Tribulus hystrix R. Br. This species belongs to the family Zygophyllaceae, and is generally distributed in the South Sea Islands. So far as known, there was no record of it on Laysan.

In collecting birds that had young, much care was exercised not to take both parents and thus to leave the nestlings to perish. This made the collecting of some species difficult and slow. Fortunately we were able to preserve and so utilize many birds that were found dead on the rookeries.

The Laysan Cyclorama at the Museum was completed in 1914. It still stands as unique and as beautiful as the day it was opened to the public. It has been viewed and admired by many thousands of visitors and students. To Iowa graduates the name Laysan Island is an integral part of the Iowa campus. Three land birds of Laysan are now extinct, and two other species are likely to follow, being sadly reduced in numbers.

Birds on Laysan Island

[The following list of Laysan Island birds, with notes on their distribution, habits, nests, and eggs, was prepared by the writer in accordance with the agreement made with the Biological Survey. The author also furnished them with a set of bird skins and photographs. The Chicago Museum of Natural History requested a set of skins in return for releasing Mr. Corwin from a painting contract. The two institutions agreed that they would not use the bird skins to make an exhibit such as the Iowa Museum had planned. A similar agreement was made with the members of the party. Although over forty years have passed, these agreements have never been violated.]

Sooty-backed Tern.

Upon our arrival at Laysan we did not observe many sooty-backed terns. There was a small colony of about 500 birds on the southwest part of the island and another of about the same size on the extreme east. We found great piles of bones near the former which led us to believe their numbers had been much reduced by the plume hunters. About May 6 thousands appeared on the east side of the island and about a week later others came to the southwest. As the southwest rookery grew, it extended toward the north. On June 1 we measured the rookeries, and two days later we went over the same ground again. We found that in two days the rookeries on the west side had increased in area 3,600 square yards. The final estimate of the number of sooty terns was made June 4 — 333,900 for both rookeries. This species outnumbered any other on the island.

Gray-backed Tern.

On the rocks at the south end of the island there was a small colony of gray-backed terns. Its close proximity to the sooty tern rookery might mislead the casual observer as to the number of birds of this species. As soon as the birds were disturbed, the sooty terns flew about with the gray-backs, giving the impression that there were thousands of the latter. The unfortunate gray-back made a desirable skin for millinery purposes; hence his demise. There were other small rookeries on the east side; about 50,000 of these birds were nesting.

Noddy.

Noddies were nesting in small colonies on nearly all parts of the island, especially on the northwest point, and during the last week of May fresh eggs were found. There were 5,500 noddies.

Hawaiian Tern.

This little understudy of the noddy was found in all stages. It numbered only about 3,000.

White Tern or Love Bird.

During our first week on Laysan we saw only four white terns. This little bird was one of the first to disappear at the hands of the poachers. About the time the sooty terns arrived in abundance, we noticed a number of white terns. On May 15 we discovered several pairs nesting on the rocks at the south end; later others were found on different parts of the island, in all, about 75.

Laysan Albatross.

Along the shores of the lagoon and on a small area at the south end of the island this remarkable and interesting bird had taken its last stand. About one-sixth of the original colony seen by Nutting in 1902 was left. All along the car track and on the main rookery, where the birds were formerly so abundant, only piles of bones remained. About all of the old main rookery had been annihilated; only now and then a pair of birds with young could be seen. Along the shores of the lagoon they were still to be found in large numbers, and to one who had never seen such masses of birds, it was a wonderful sight. They amused themselves with a strange proceeding, which at times seemed to be done more from a sense of duty than for pleasure. The performance was varied, but usually began as follows: one bird approached another with an indescribable squeaking sound, bowing all the time. If the other bird felt like performing, which was usually the case, he bowed in return. They crossed bills very rapidly several times. Then one bird turned its head and lifted one wing in such a manner that the primaries pointed directly out at the side. In the meantime, the other bird kept up a loud noise that sounded somewhat like the neighing of a horse. The bird taking the lead then walked around his partner, stepping high like a Negro cakewalker. This part of the procedure was usually closed by one or both

birds pointing their beaks straight up in the air, rising on their toes, puffing out their breasts, and uttering a long-drawn groan. The same thing was repeated many times with slight variations. There were comparatively few young albatrosses. This bird totaled about 180,000.

Black-footed Albatross.

Along the beaches of the north, east, and south sides of the island the black-footed albatross had taken almost complete possession. An occasional pair could be found nesting with the white species, but they were usually found by themselves. The black-footed albatross is somewhat larger than the white species, and is a superior aviator. They followed our ship all the way from San Francisco to the Hawaiian Islands. They have a performance similar to that of the former species but much more elaborate, and they go through the figures slowly and gracefully. Instead of lifting one wing, they raise both. The notes uttered during the performance are much softer, ending with a sound like the stroke of a bell under water or deep within the bird's stomach. They are very neighborly with the other species. We often saw them visiting, and on one or two occasions they tried to perform with them, but the rapid pace set by the white bird was rather too much for his more deliberate cousin. The total number was about 85,000.

Wedge-tailed Shearwater.

This bird was found on nearly every part of Laysan, with the exception of the beaches and the hard shore of the central lagoon. It did not fly about much during the day, but sat in the mouth of its burrow dozing in the sun. At times a dozen or more congregated, apparently for the purpose of quarreling. Their cat-like squalls soon made the quarreling. They numbered about 100,000.

Christmas-Island Shearwater.

This is a common bird on Laysan. We found it nesting under the bushes and in shallow burrows. Its eggs were fresh during the first two weeks of May. Its retiring habits and unattractive plumage had protected it from the poachers. It numbered about 75,000.

White-Breasted or Bonin Island Petrel.

In the daytime this bird was not conspicuous, but it was abundant in the evening. It was a fearless, dove-like creature, quite amenable to petting and stroking. The young of this species were nearly fledged. They were to be seen in the mouths of the deep burrows which completely honeycomb the higher ground of the island. They numbered 160,000.

Bulwer's Petrel.

In cracks and crannies of the rocks on the south end of the island one was sure of finding these

birds, usually a pair in the same opening. We found them scattered about wherever there were pieces of phosphate rock or coral under which to crawl. While we were after some specimens of coral rock, we were much surprised to find one of these quiet little birds sitting in the debris that had fallen from the under side as we applied the sledge hammer from above. The pieces had dropped in such a manner that, notwithstanding the falling of a piece weighing 75 pounds or more, the bird was unharmed and apparently not alarmed. Under the bird we found a fresh egg. Although we had previously seen many of these birds, we had not found any eggs. Further search disclosed that the birds on the south end of the island had eggs, all of which were fresh. In some nests we found both birds sitting side by side. They numbered 1,000.

Sooty Petrel.

This is not a common bird on Laysan. Near the south end of the lagoon a number of the young were found, all dead or dying. They were fully fledged, retaining only traces of down. A diligent search procured but two adults.

Red-Tailed Tropic Bird.

During the first three weeks of our stay on the island we saw very few of these birds. They were wild and very hard to catch. Later, however, we saw plenty of them; when they were nesting we experienced no trouble in catching them in our

hands. They had by far the most beautiful plumage of any of the birds found there. Their rose-tinted satin bodies, bright coral red beaks, and elongated central tail feathers made them striking birds indeed. The poachers had killed many of them, but they still numbered about 300.

Blue-faced Booby.

A small colony of these birds was nesting on a sandy beach on the east coast. By actual count, fifty-four birds were there during the first week in May. Large downy young were in the nests, usually only one, but in some cases two. A few eggs were found, but all were well incubated. On June 5 we were somewhat surprised to find about twenty pairs of these birds nesting on the interior slope of the east side of the island in close proximity to the man-o'-war bird rookery. Why they should choose such an environment was hard to understand. Nearly all of the nests contained two fresh eggs. Not far from this spot we saw a man-o'-war bird pursuing a booby just returned from fishing, with a crop full of fish. At first it seemed as though the booby would outfly its pursuer, but its load was too heavy. The man-o'-war bird overtook the booby, seized it by the tail, raised itself in the air, and turned it completely over. Being thus rudely overturned, the booby lost control and quickly disgorged the contents of its crop. The man-o'-war bird actually caught the fish as it came from the booby's mouth.

Red-footed Booby.

This bird is not very abundant, being confined to a small area on the north side of the island. There were about 125 in all.

Man-o'-war Bird.

On the inner eastern slope of the island these birds were found nesting in colonies in the tops of low bushes which, if placed together, would have covered about six acres. As it was, however, they appeared to cover many times that amount of space. Here, sitting quietly on each nest, was its owner, holding down his claim. When one bird left the nest, the mate immediately took its place, for if a nest was left unguarded, the birds that seemed to be off duty swooped down, apparently passing nearly over it, and with a quick movement of the beak picked up a stick and carried it away. Thus, stick by stick, the nest was completely removed. If there happened to be a young bird or an egg in the nest, it was destroyed and eaten by the winged cannibals. One forgot the shortcomings of these birds when he saw them sailing on motionless wing far above him. They make use of the hot air currents arising from the island and sail about with very little effort. They numbered 12,500.

Laysan Teal.

These birds were not seen for the first few days of our stay. Then we found feathers and other parts of those that the marauders had dressed for

food. Later, however, we saw them in small flocks, six being the most seen at one time. Some teals seemed to be nesting in the grass near the small fresh-water pond on the south end of the island, but we were unable to find any nests. The man-o'-war birds persistently pursued them, but they did not to my knowledge kill or harm any of them. They, however, kill young teals. Presumably the plumage hunters killed them for food, and thus nearly exterminated them.

Laysan Rail.

This was one of the most interesting birds on the island. Notwithstanding its inability to fly, it has no trouble in evading its pursuers. It ran and dodged from one grass tussock to another, down a petrel hole and out again before one could locate it. One of the most laughable things imaginable is a man pursuing one of these bits of bird life, net in hand, continually dropping waist-deep down among the burrowing petrels. It was with much difficulty that we secured the specimens we needed for our collection. They were everywhere fairly abundant on all parts of the island except on the beaches. They even visited our kitchen. Their favorite nesting place was among the mats of juncus along the margin of the lagoon. We found many nests but no eggs. On June 4 we discovered two coal-black chicks with yellow beaks that gave vent to much noise. There were about 2,000.

Wandering Tatler.

Very few of these birds were seen on Laysan during our stay. Occasionally they appeared on the reef or among the large rocks on the beach, but they were very wild. One only was taken.

Bristle-thighed Curlew.

Just before sunset and early in the morning these birds would come up around our camp uttering their peculiar complaining notes. They roosted on the roofs of the old low buildings at night, sometimes as many as twenty in a flock. They numbered about 250.

Pacific Golden Plover.

The golden plover is only a migrant on Laysan. About 2,000 were present at the time of our visit.

Turnstone.

In the shallow water of the lagoon and about the fresh-water pond, large flocks of plover and turnstones were to be seen. Here they spent most of their time feeding on the small flies which blackened shore and water. The specimens we prepared for our collection were exceedingly fat. The turnstones numbered about 2,500.

Miller Bird.

With the exception of the Laysan teal, the miller bird is the least abundant of the indigenous birds. We saw a few of them around the old buildings and others about the island, but princi-

pally in the tall grass along the west shore of the lagoon, where a few nests containing eggs and young birds were found. A pair made a nest not far from our sleeping quarters. The birds seemed not to mind our presence, working away at the nest when we were within two feet of them. After the nest was completed, the female bird died while laying an egg. We saved the skin and also the egg. In a few days the male bird returned with a new mate; much to our surprise, the birds took down the old nest and built a new one a few feet away. It seemed strange that this bird should not be more common, as it was reported in 1902 to be the most abundant of the island birds. Presumably the poachers caught the miller bird, but we have no proof of it, as no skins or other parts were found. Its numbers were kept in check by the finches — at least we saw the latter eating the eggs of this species. Undoubtedly, however, this had been the practice for many years, and did not seem to make any appreciable difference in the numbers.

Laysan Honey-eater.

This bird is not common on Laysan. Four of this species roosted on an old rope which hung across the corner in one of the sheds. Here each night we would see them huddled closely together. Occasionally one would flit into our workroom in quest of millers. They were to be seen about the island in the tall tussocks of grass where we found

a few nests, all of which contained young birds or well-incubated eggs. There were probably 300.

Laysan Finch.

One of the last birds to disappear from the island will be the Laysan finch. With its omnivorous habits and its saucy, fearless manner it easily adapts itself to conditions as it finds them. It is a fine songster and makes a good cage bird. Laysan Island is a fine place for them, but should anyone be rash enough to introduce them to a civilized community they would rival the English sparrow. They were everywhere abundant about the island, particularly near the tern rookeries. When we passed through the rookeries they would follow, stealing the eggs left exposed by the terns we had frightened away. They also eat other birds' eggs, not excepting their own species. Our cook experienced much difficulty in keeping them from the kitchen. At last he was obliged to put up a net at the door to keep them out. They also visited our storeroom, pecking holes in our rice bag and making away with quite a quantity. At meal time they were at our feet pecking at the crumbs on the floor. It was not an uncommon thing to see them on the table. They were nesting during the month of May, and we found many nests with fresh eggs. We estimated the total number to be about 2,700.

Directory of the University Museum of Natural History

Basement Floor:

South: JAVANESE BATIK COLLECTION
MEXICAN COLLECTION

Corridor: INVERTEBRATES

North: ETHNOLOGICAL HALL

First Floor:

Corridor, North:
IOWA WINTER BIRDS
EXTINCT BIRDS
HORNS AND ANTLERS

Third Floor:

North: BIRD HALL

South: MAMMAL HALL

LAYSAN ISLAND CYCLORAMA

The famous Laysan Island Cyclorama in Bird Hall is 138 feet long and 12 feet high. This is the only cycloramic exhibit of bird life in the world. In it there are many hundreds of birds representing twenty-three species, five of which are peculiar to Laysan Island. The mounting of all the birds, the artificial rock-work, the bushes and grasses, as well as the composition of the groups and the assembling of the whole was the work of Professor Homer R. Dill. Most of the artificial leaves were made by students under his direction. More than fifty thousand leaves were made from casts of the real leaves from the Island. The background painting was done by Charles A. Corwin of Chicago. Following is a list of the twenty-three species:

Sterna fuliginosa Gmelin. Sooty-backed Tern

Sterna lunata Peale. Gray-backed Tern

Anous stolidus (Linn.). Noddy

Micranous hawaiiensis Rothschild. Hawaiian Tern

Gygis alba kittlitzi Hartert. Love Bird

Diomedea immutabilis Rothschild. Laysan Albatross

Diomedea nigripes Audubon. Black-footed Albatross

Puffinus cuneatus Salvin. Wedge-tailed Shearwater

Puffinus nativitatis Streets. Christmas-Island Shearwater

Aestrelata hypoleuca Salvin. White-breasted Petrel

Bulweria bulweri (J. & S.). Bulwer's Petrel

Oceanodroma tristrami Salvin. Sooty Petrel

Phaethon rubricauda Boddaert. Red-tailed Tropic Bird

Sula cyanops (Sundevall.). Blue-faced or Sand Gannet

Sula piscator (Linn.). Red-footed or Bush Gannet

Fregata aquila (Linn.). Man-o'-war Bird

Anas laysanensis Rothschild. Laysan Teal

Porzanula palmeri Frowhawk. Laysan Rail

Numenius tahitiensis (Gmelin). Bristle-thighed Curlew

Charadrius dominicus fulvus (Gmelin). Pacific Golden Plover

Arenaria interpres (Linn.). Turnstone

Himatione freethi Rothschild. Laysan Honey-Eater

Acrocephalus familiaris (Rothschild). Miller Bird